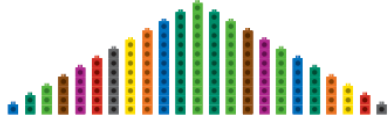


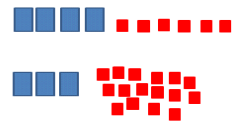




Number

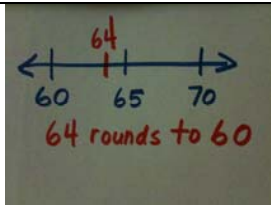

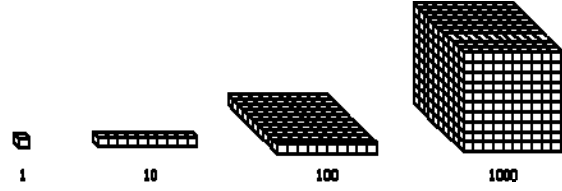
- Key idea: use of concrete and pictorial representations
- Key idea: pattern & structure in number/counting
- Key idea: counting as measure (including, for example, using as ruler as a number line)


Key: using & applying refs; new ideas, concepts, terminology

	Programme of study (statutory)	Notes and guidance (non-statutory)	Comments	Glossary & examples
1	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • count, read and write numbers to 100 in numerals, count in different multiples including twos, fives and tens • given a number, identify one more and one less • identify and represent numbers using concrete objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least • read and write numbers from 1 to 20 in numerals and words. 	<p>Pupils practise counting (1, 2, 3), ordering (e.g. first, second, third), or to indicate a quantity (e.g. 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.</p> <p>Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by concrete objects and pictorial representations.</p> <p>They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (e.g. odd and even numbers), including through varied and frequent practice through increasingly complex questions.</p> <p>They recognise and create repeating patterns with objects and with shapes.</p>	<ul style="list-style-type: none"> • Numbers now to 100 instead of 20. • More vocabulary – more than, less than, most, least. 	<p>Enumerating means to count with meaning/understanding (e.g. counting the number of items on a table) as opposed to reciting numbers</p>   <p>Ordinal: the natural numbers used to describe the position of an object in a set e.g. 1st, 8th, 20th</p> <p>Cardinal: the natural numbers used to describe 'how many' objects there are in a set</p>

<p>2</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward recognise the place value of each digit in a two-digit number (tens, ones) identify, represent and estimate numbers using different representations, including the number line compare and order numbers from 0 up to 100; use <, > and = signs read and write numbers to at least 100 in numerals and in words use place value and number facts to solve problems. <p>Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of three to support their later understanding of a third.</p> <p>As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations.</p> <p>Pupils should partition numbers in different ways (e.g. $23 = 20 + 3$ and $23 = 10 + 13$) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand zero as a place holder.</p>	<ul style="list-style-type: none"> Steps of 3 – new Old curriculum had 2 and 3 digit numbers. New – numbers to 100. Key idea: multiples of 3 to support later understanding of a $\frac{1}{3}$ Key idea: use of concrete and pictorial representations Spatial representations link measure with place value 	<p>Spatial representations: pictorial representations that emphasise the spatial aspects of a problem as in the positions of objects and people in space relative to each other e.g</p> <p>At each of the two ends of a straight path, a man planted a tree and then every 5 metres along the path he planted another tree. The length of the path is 15 metres. How many trees were planted?</p>  <p>Four trees, five metres apart</p> <p>Re-partitioning e.g.</p> <p> $46 = 40 + 6$ $46 = 30 + 16$ $46 = 20 + 26$ $46 = 10 + 36$ etc </p> 
<p>3</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> count from 0 in multiples of 4, 8, 50 and 100; finding 10 or 100 	<p>Pupils now use multiples of 2, 3, 4, 5, 8, 10, 50 and 100.</p> <p>They use larger numbers to at least</p>	<p>Representations relating to measure</p> <p>In a running race, Jim is four metres ahead of Tom and Peter is three metres behind Jim. How far is Peter ahead of Tom?</p>

	<p>more or less than a given number</p> <ul style="list-style-type: none"> • recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • compare and order numbers up to 1000 • identify, represent and estimate numbers using different representations • read and write numbers to at least 1000 in numerals and in words • solve number problems and practical problems involving these ideas. 	<p>1000, applying partitioning related to place value using varied and increasingly complex problems, building on work in year 2 (e.g. $146 = 100$ and 40 and 6, $146 = 130$ and 16).</p> <p>Using a variety of representations, including those related to measure, pupils should continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000.</p>	<p>reference to counting on or back in multiples of 10</p> <ul style="list-style-type: none"> • Finding 10 or 10 more or less than a given number – new • Rounding has gone – rounding objectives now introduced in Year 4. • No halving and doubling 	<p>Tom Peter Jim</p>  <p>What is Computational Fluency? Fluency includes three ideas: efficiency, accuracy, and flexibility:</p> <ul style="list-style-type: none"> • <i>Efficiency.</i> An efficient strategy is one that the student can carry out easily, keeping track of sub problems and making use of intermediate results to solve the problem. • <i>Accuracy</i> includes careful recording, knowledge of number facts and other important number relationships, and double-checking results. • <i>Flexibility</i> requires the knowledge of more than one approach to solving a particular kind of problem, and the ability to select the most appropriate one.
4	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • Count in multiples of 6, 7, 9, 25 and 1000 • Find 1000 more or less than a given number • Count backwards through zero to include negative numbers • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones) 	<p>Using a variety of representations, including measures, pupils should become fluent in the order and place value of numbers tens and hundreds, and beyond 1000, including counting in maintaining fluency in other multiples through varied and frequent practice.</p> <p>They begin to extend their knowledge of the number system to include the decimal numbers and fractions that</p>	<ul style="list-style-type: none"> • Counting in multiples of 6, 7, 9, 25 and 1000 – new. No reference to counting on or back in equal steps • Partitioning not mentioned • Rounding now in Y4 • Finding a 1000 more or less – new • Roman numerals – new 	<p>Concept of zero: acts as the place-holder in the Hindu-Arabic number system and as a number in its own right (see http://www.youtube.com/watch?v=fpCD9NeOXdg)</p> <p>A variety of representations could include:</p> <p>Cuisenaire Rods</p> 

	<ul style="list-style-type: none"> Order and compare numbers beyond 1000 Identify, represent and estimate numbers using different representations Round any number to the nearest 10, 100 or 1000 Solve number and practical problems that involve all of the above and with increasingly large positive numbers Read Roman numerals to 100 (I to C) and understand how, over time, the numerical system changed to include the concept of zero and Place Value. 	<p>they have met so far.</p> <p>They connect estimation and rounding numbers to the use of measuring instruments.</p> <p>Roman numerals should be put in their historical context so pupils understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time.</p>	<ul style="list-style-type: none"> No decimals – moved to fractions and decimals No reference to addition, subtraction, multiplication and division facts. Now in multiplication and division No reference to doubles and halves History of place value & our number system 	<p>Number lines</p>  <p>PV counters</p>  <p>Dienes Apparatus</p> 
5	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000 interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through 	<p>Pupils identify the place value in large whole numbers.</p> <p>They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far.</p> <p>They should recognise and describe linear number sequences (e.g. 3, 3 ½,</p>	<ul style="list-style-type: none"> numbers to a million – new Steps in power of 10 – new Rounding numbers to 100,000 Roman numerals <p>Linear number sequences: A number pattern which increases (or decreases) by the same amount each time e.g.</p> <ul style="list-style-type: none"> 1, 4, 7, 11 ... 5, 15, 25 ... ¼, ½, ¾, 1 ... <p>This sequence increases by one quarter each time.</p>	

	<p>zero</p> <ul style="list-style-type: none">• round any number up to 1,000, 000 to the nearest 10, 100, 1000, 10,000 and 100,000• solve number problems and practical problems that involve all of the above• read Roman numerals to 1000 (M) and recognise years written in Roman numerals. Real life examples.	4, 4 ½ , ...) including those involving fractions and decimals, and find the term-to-term rule (e.g. add ½).																																																																																						
6	<p>Number</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none">• read, write, order and compare numbers up to 10,000,000 and determine the value of each digit• round any whole number to a required degree of accuracy• use negative numbers in context, and calculate intervals across zero• solve number problems and practical problems that involve all of the above	Pupils should use the whole number system, including saying, reading and writing numbers accurately.	10, 000 000 new	<div><p>Real life examples of big numbers:</p><table><thead><tr><th>Country Name</th><th>Population</th><th>Area (Sq. Km.)</th><th>Population Density (Sq. Km.)</th><th>Area (Sq. Mi.)</th><th>Population Density (Sq. Mi.)</th></tr></thead><tbody><tr><td>1 China</td><td>1,339,190,000</td><td>9,596,960.00</td><td>139.54</td><td>3,705,405.43</td><td>361.42</td></tr><tr><td>2 India</td><td>1,184,639,000</td><td>3,287,590.00</td><td>360.34</td><td>1,269,345.07</td><td>933.27</td></tr><tr><td>3 United States of America</td><td>309,975,000</td><td>9,629,091.00</td><td>32.19</td><td>3,717,811.29</td><td>83.38</td></tr><tr><td>4 Indonesia</td><td>234,181,400</td><td>1,919,440.00</td><td>122.01</td><td>741,099.62</td><td>315.99</td></tr><tr><td>5 Brazil</td><td>193,364,000</td><td>8,511,965.00</td><td>22.72</td><td>3,286,486.71</td><td>58.84</td></tr><tr><td>6 Pakistan</td><td>170,260,000</td><td>803,940.00</td><td>211.78</td><td>310,402.84</td><td>548.51</td></tr><tr><td>7 Nigeria</td><td>170,123,000</td><td>923,768.00</td><td>171.32</td><td>356,668.67</td><td>443.71</td></tr><tr><td>8 Bangladesh</td><td>164,425,000</td><td>144,000.00</td><td>1,141.84</td><td>55,598.69</td><td>2,957.35</td></tr><tr><td>9 Russia</td><td>141,927,297</td><td>17,075,200.00</td><td>8.31</td><td>6,592,768.87</td><td>21.53</td></tr><tr><td>10 Japan</td><td>127,380,000</td><td>377,835.00</td><td>337.13</td><td>145,882.85</td><td>873.17</td></tr><tr><td>11 Mexico</td><td>108,396,211</td><td>1,972,550.00</td><td>54.95</td><td>761,605.50</td><td>142.33</td></tr><tr><td>12 Philippines</td><td>94,013,200</td><td>300,000.00</td><td>313.38</td><td>115,830.60</td><td>811.64</td></tr><tr><td>13 Vietnam</td><td>85,789,373</td><td>329,560.00</td><td>260.32</td><td>127,243.78</td><td>674.21</td></tr></tbody></table></div>	Country Name	Population	Area (Sq. Km.)	Population Density (Sq. Km.)	Area (Sq. Mi.)	Population Density (Sq. Mi.)	1 China	1,339,190,000	9,596,960.00	139.54	3,705,405.43	361.42	2 India	1,184,639,000	3,287,590.00	360.34	1,269,345.07	933.27	3 United States of America	309,975,000	9,629,091.00	32.19	3,717,811.29	83.38	4 Indonesia	234,181,400	1,919,440.00	122.01	741,099.62	315.99	5 Brazil	193,364,000	8,511,965.00	22.72	3,286,486.71	58.84	6 Pakistan	170,260,000	803,940.00	211.78	310,402.84	548.51	7 Nigeria	170,123,000	923,768.00	171.32	356,668.67	443.71	8 Bangladesh	164,425,000	144,000.00	1,141.84	55,598.69	2,957.35	9 Russia	141,927,297	17,075,200.00	8.31	6,592,768.87	21.53	10 Japan	127,380,000	377,835.00	337.13	145,882.85	873.17	11 Mexico	108,396,211	1,972,550.00	54.95	761,605.50	142.33	12 Philippines	94,013,200	300,000.00	313.38	115,830.60	811.64	13 Vietnam	85,789,373	329,560.00	260.32	127,243.78	674.21
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